

Computer Science

TEXTURE FEATURE EXTRACTION USING PRINCIPAL COMPONENT

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Many researches in the data analysis field apply Principal Component Analysis (PCA) not only because PCA can reduce the dimensionality of features describing the data, but also because it can be used to reconstruct a new data set where the redundancy and noise in the data are significantly decreased. In this paper, we applied the PCA technique to the medical domain with the goal of reducing the set of texture features characterizing the texture properties of the tissues in Computed Tomography (CT) images of the chest and of the abdomen. The data set consisted of 1360 images and 25 texture descriptors. Some descriptors were correlated with one another because, even though they were calculated using different texture models (co-occurrence, run-length encoding, and statistical moments), they were capturing same properties of the texture. Therefore, our project aims at extracting new features that are uncorrelated, and still capture most of the information in the data. Our preliminary results show that the feature space can be reduced from 25 features to 5 new features (principal components) which still take into account over 90% of the variance in the texture data. Moreover, each principal component is a combination of features that relate to the same texture property and therefore, they can be named by the texture property (distribution of grey level, frequency of similar pixel pairs, intensity of the image, similarity through out the image, and sharpness) that they describe.